Econ 2450B, Topic 1: Basics of Welfare Estimation

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Goal of Public Finance

- Study the interaction between the government and the economy
- Strong normative component
  - Should we increase taxes?
  - Should we spend more on education, roads, etc.?
  - Should we change the mix of taxes (e.g. commodity vs. property vs. capital vs. income taxes)?
- Requires notion of "should"
  - Use economics to formalize notions of welfare
  - Question: How would you define "Welfare"?

Intellectual History

- Key idea of economics: Build "Welfare" from individual's willingness to pay
  - Consumer surplus (Marshall 1890)
  - Compensating variation and Equivalent variation (Hicks 1939, 1940, 1941; Kaldor 1939)
- Recent literature on "Sufficient statistics"
  - Shows how local elasticities map into welfare analysis of small policy changes
  - Provides "first order" link between theory and empirics
    - But, envelope theorem is useful for analyzing small welfare changes

Intellectual History

- Many definitions of welfare:
  - Marginal excess burden (Harberger 1964, Feldstein 1999, Kleven and Kreiner 2005)
  - Marginal willingness to pay (Mayshar 1990, Slemrod and Yitzhaki 1996, 2001, Kleven and Kreiner 2006, Hendren 2016)
  - Marginal Cost of Funds (Stiglitz and Dasgupta 1970, Atkinson and Stern 1971)
- Set up a general economic model to define these concepts
  - Will argue MWTP is particularly useful from an empirical perspective because it uses causal effects of the policy in question

Question

- Suppose you have a policy in mind
  - e.g. TPP, electric car subsidies, job training...
- What do you need to estimate to know the impact of the policy on social welfare?

This Lecture

- This lecture illustrates how to move from positive analysis to normative analysis
  - You've estimated a causal effect and now you want to say something about "welfare"
- Key lessons: To first order, three types of parameters are fundamental for welfare:
  1. Individuals' willingness to pay (out of their own income) for the policy change
  2. Impact of behavioral responses on externalities
     - Key externality: Fiscal externality of behavioral response on gov't revenue
  3. Social marginal utilities of income (Saez and Stantcheva, 2016)
- Things one does not need to know:
  - Behavioral responses that don't induce externalities
  - Decompositions of behavioral responses (income vs. substitution effects)

Roadmap

- Welfare is about benefits versus costs
- Given a policy, P,
  - We need to define its marginal benefit, $Benefit^P$
  - And its marginal cost to the government, $Cost^P$
- And we construct the benefit per unit cost:

$$MVPF^P = \frac{Benefit^P}{Cost^P}$$

- Spending more gov't dollars on a policy with a higher (lower) MVPF increases (decreases) welfare

1. Theory

2. Empirics

Setup

- Follow model in Hendren (2016), "The Policy Elasticity"
  - Similar results (different notation) in Slemrod and Yitzhaki (2001) and Kleven and Kreiner (2006)
- Unit mass of individuals, indexed by i
- Individual i chooses:
- Goods x_i and labor supply l_i
  - Could be vectors of goods/labor supply activities
- Government chooses:
  - Publicly provided goods and services, G, at marginal cost c
  - Taxes on goods and labor supply: τ_i^x and τ_i^l
  - Transfers T_i
  - Non-linear taxes?

Utility function

- Individuals have utility function

$$u_i\left(x, l, G\right)$$

  - Production: Goods are produced linearly with one unit of labor supply

$$\left(1+\tau_i^x\right) x_i \leq \left(1-\tau_i^l\right) l_i + T_i$$

  - What have we ruled out?
    - Spillovers/GE effects (individual i's choice of l_i doesn't affect individual j's wage)
    - Profits?
    - Single budget constraint (Dynamics? Uncertainty?)

Maximization

- Indirect utility function

$$V_i\left(\tau_i^x, \tau_i^l, G_i\right) = \max_{x_i, l_i} \; u_i\left(x_i, l_i, G_i\right)$$

s.t.

$$\left(1+\tau_i^x\right) x_i \leq \left(1-\tau_i^l\right) l_i + T_i$$

- Lagrange multiplier λ_i is marginal utility of income

Social Welfare

- Social welfare function

$$W\left(\left\{\tau_i^x, \tau_i^l, G\right\}_i\right) = \sum_i \psi_i V_i\left(\tau_i^x, \tau_i^l, G_i\right)$$

- Bergson (1938)-Samuelson (1947)
- Does ψ_i depend on things other than utility? (Saez and Stantcheva 2013)
- Does it matter that we assume weights are linear?
  - Not for small policy changes (ψ_i is the derivative of the SWF w.r.t. person i's utility)

Policy Changes

- Define a "Policy Path" to trace out changes to government policy, $P(\theta)$:
- For any $\theta \in (-\epsilon, \epsilon)$

$$P(\theta) = \left\{ \left\{ \hat{\tau}_{ij}^{l}(\theta) \right\}_j, \left\{ \hat{\tau}_{ij}^{x}(\theta) \right\}_j, \hat{T}_i(\theta), \hat{G}_i(\theta) \right\}_i,$$

  - Two assumptions (Draw Picture):
    1. $\theta = 0$ is status quo:

$$\left\{ \left\{ \hat{\tau}_{ij}^{l}(0) \right\}, \left\{ \hat{\tau}_{ij}^{x}(0) \right\}, \hat{T}_i(0), \hat{G}(0) \right\}_i = \left\{ \left\{ \tau_{ij}^{l} \right\}, \left\{ \tau_{ij}^{x} \right\}, T_i, G_i \right\}_i$$

    2. $P(\theta)$ is continuously differentiable in θ
       - $\frac{d\hat{\tau}_{ij}^{x}}{d\theta}$, $\frac{d\hat{\tau}_{ij}^{l}}{d\theta}$, $\frac{d\hat{T}_i}{d\theta}$, and $\frac{d\hat{G}_i}{d\theta}$ exist and are continuous in θ
- Should the government follow the policy path and increase θ?
  - Need to measure how welfare changes with θ
  - First, start with the positive questions...

Positive Analysis: Agent's Behavior and Government Budget

- Agents optimally choose $\mathbf{x}_i$ and $\mathbf{l}_i$ facing policy $P(\theta)$
  - $\widehat{\mathbf{x}}_i(\theta) = \{\hat{x}_{ij}(\theta)\}_j$ and $\widehat{\mathbf{l}}_i(\theta) = \{\hat{l}_{ij}(\theta)\}_j$
    - These are "potential outcomes" in world $P(\theta)$
    - Canonical definitions of causal effects
- Net government resources towards individual i,

$$\hat{t}_i(\theta) = c\hat{G}_i(\theta) + \hat{T}_i(\theta) - \sum_{j=1}^{J_X} \hat{\tau}_{ij}^x(\theta)\hat{x}_{ij}(\theta) - \sum_{j=1}^{J_L} \hat{\tau}_{ij}^l(\theta)\hat{l}_{ij}(\theta)$$

- Budget neutrality would be $\sum_i \frac{d\hat{t}_i}{d\theta} = 0 \quad \forall\theta$
  - $\frac{d\hat{t}_i}{d\theta}$ captures distributional impact
- Behavioral response affects budget

$$\frac{d}{d\theta}\left(\sum_{j=1}^{J_X} \hat{\tau}_{ij}^x(\theta)\hat{x}_{ij}(\theta) + \sum_{j=1}^{J_L} \hat{\tau}_{ij}^l(\theta)\hat{l}_{ij}(\theta)\right) = \underbrace{\left(\sum_j^{J_X} \frac{d\hat{\tau}_{ij}^x}{d\theta}x_{ij} + \sum_j^{J_L} \frac{d\hat{\tau}_{ij}^l}{d\theta}l_{ij}\right)}_{\text{Mechanical Impact on Govt Revenue}} + \underbrace{\left(\sum_j^{J_X} \tau_{ij}^x \frac{d\hat{x}_{ij}}{d\theta} + \sum_j^{J_L} \tau_{ij}^l \frac{d\hat{l}_{ij}}{d\theta}\right)}_{\text{Behavioral Impact on Govt Revenue}}$$

Normative Analysis: Marginal Willingness to Pay for Policy

- Normative questions:
  - WTP: How much are people willing to pay to move along the policy path?
- Person i's marginal willingness to pay to move along the policy path

$$\frac{\frac{d\hat{V}_i}{d\theta}\big|_{\theta=0}}{\lambda_i}$$

  - Money metric utility measure
  - Equivalent to marginal EV and marginal CV
    - Why?

Characterization of Marginal Willingness to Pay for Policy

- The envelope theorem (Draw Picture) implies:

$$\frac{\frac{d\hat{V}_i}{d\theta}|_{\theta=0}}{\lambda_i} = \frac{\frac{\partial u_i}{\partial G_i}}{\lambda_i}\frac{d\hat{G}_i}{d\theta} + \frac{dT_i}{d\theta} - \sum_j^{J_X}\frac{d\hat{\tau}_{ij}^x}{d\theta}x_{ij} - \sum_j^{J_L}\frac{d\hat{\tau}_{ij}^l}{d\theta}l_{ij}$$

  - Behavioral responses don't affect utility directly
- Does this mean we don't need to estimate behavioral responses?
  - What about discrete choices? (e.g. extensive margin labor supply?)

Characterization of MWTP

- Behavioral responses matter in keeping track of net resources
- Now, substitute:

$$\frac{d\hat{T}_i}{d\theta} = \frac{d\hat{t}_i}{d\theta} - c\frac{d\hat{G}_i}{d\theta} + \frac{d}{d\theta}\left(\sum_{j=1}^{J_X} \hat{\tau}_{ij}^x(\theta)\,\hat{x}_{ij}(\theta) + \sum_{j=1}^{J_L} \hat{\tau}_{ij}^l(\theta)\,\hat{l}_{ij}(\theta)\right)$$

- This yields:

$$\frac{\frac{d\hat{V}_i}{d\theta}|_{\theta=0}}{\lambda_i} = \underbrace{\frac{d\hat{t}_i}{d\theta}}_{\text{Net Resources}} + \underbrace{\left(\frac{\frac{\partial u_i}{\partial G_i}}{\lambda_i} - c\right)\frac{d\hat{G}_i}{d\theta}}_{\substack{\text{Public Spending/} \\ \text{Mkt Failure}}} + \underbrace{\left(\sum_j \tau_{ij}^x \frac{d\hat{x}_{ij}}{d\theta} + \sum_j \tau_{ij}^l \frac{d\hat{l}_{ij}}{d\theta}\right)}_{\substack{\text{Behavioral Impact} \\ \text{on Govt Revenue}}}$$

  where the RHS is evaluated at $\theta = 0$.
  - Behavioral responses matter to the extent to which individuals impose resource costs for which they don't pay
- If government taxation is only wedge between social and private costs, a single causal effect is sufficient
  - Impact on government revenue is sufficient for all behavioral responses

Budget-Neutral Policies

- If policy is budget neutral towards individual i, then

$$\frac{\frac{d\hat{V}_i}{d\theta}|_{\theta=0}}{\lambda_i} = \underbrace{\left(\frac{\frac{\partial u_i}{\partial G_i}}{\lambda_i} - c\right)\frac{d\hat{G}_i}{d\theta}}_{\substack{\text{Public Spending/} \\ \text{Mkt Failure}}} + \underbrace{\left(\sum_j^{J_X} \tau_{ij}^x \frac{d\hat{x}_{ij}}{d\theta} + \sum_j^{J_L} \tau_{ij}^l \frac{d\hat{l}_{ij}}{d\theta}\right)}_{\substack{\text{Behavioral Impact} \\ \text{on Govt Revenue}}}$$

  where the RHS is evaluated at $\theta = 0$.
  - Behavioral responses matter to the extent to which individuals impose resource costs for which they don't pay
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Non-Budget Neutral Policies

- Suppose $P_1(\theta)$ and $P_2(\theta)$ are two non-budget neutral policies
  - Marginal cost to govt of $\int_i \frac{d\hat{t}_i^{P_1}}{d\theta} di$ and $\int_i \frac{d\hat{t}_i^{P_2}}{d\theta} di$
  - Marginal social welfare of $\int_i \eta_i \frac{\frac{d\hat{V}_i^{P_1}}{d\theta}|_{\theta=0}}{\lambda_i} di$ and $\int_i \eta_i \frac{\frac{d\hat{V}_i^{P_2}}{d\theta}|_{\theta=0}}{\lambda_i} di$
- Define MVPF as in Mayshar (1990), Dahlby (1998), Slemrod and Yitzhaki (1996, 2001), Kleven and Kreiner (2006)
- Benefit-cost ratio for each policy

$$MVPF_P^{\hat{i}} = \frac{\int_i \frac{\eta_i}{\eta_{\hat{i}}} \frac{\frac{d\hat{V}_i^P}{d\theta}|_{\theta=0}}{\lambda_i} di}{\int_i \frac{d\hat{t}_i^P}{d\theta} di} = \frac{\text{"}BENEFIT\text{"}}{\text{"}COST\text{"}}$$

  - measured in units of $\hat{i}$ income

Simplified Formulas for the MVPF

- Make two simplifications helpful in empirical implementation
- Simplification #1: Assume beneficiaries have same η_i
  - Compute MVPF in units of beneficiaries' income
- Simplification #2: Suppose policy either effects market or non-market transfers

Simplified Formulas for the MVPF

- Two formulas:
  - [Market Goods/Transfers] $P(\theta)$ increases mechanical transfers/subsidies by $\$\theta$

$$MVPF = \frac{Benefit}{Cost} = \frac{1}{1+FE}$$

    - $1+FE = \frac{1}{|I|}\int_{i\in I}\frac{d\hat{t}_i^P}{d\theta}di$ is cost of providing \$1 mechanical income (which differs from \$1 because of fiscal externalities)
  - [Non-Market Goods] $P(\theta)$ increases public goods/services, G, by $\$\theta$

$$MVPF = \frac{Benefit}{Cost} = \frac{\frac{\partial u}{\partial G}\frac{1}{\lambda}}{1+FE}$$

    - Multiply by WTP for G relative to income, $\frac{\frac{\partial u}{\partial G}}{\lambda}$
    - What if G is spending on a tax cut? Then, you can show $\frac{\frac{\partial u}{\partial G}}{\lambda} = 1$, so the formula reduces to $\frac{1}{1+FE}$.

Properties

- Comparisons of MVPF correspond to comparisons of social welfare
- If beneficiaries of P_1 and P_2 are the same, welfare impact of budget-neutral policy with more P_2 and less P_1

$$MVPF_{P_2} - MVPF_{P_1}$$

- Government spending on policies with high MVPF financed from low MVPF policies increases social welfare
  - But need beneficiaries are the same

Comparisons Using Okun's Bucket

- What if beneficiaries of P_1 and P_2 differ?
- Suppose η_i is constant within the set of beneficiaries
  - Beneficiaries of P_1 have equal social marginal utility of income η_1
    - $MVPF^1_{P_1}$ is marginal benefit to beneficiaries, normalized by govt cost
  - Beneficiaries of P_2 have equal social marginal utility of income η_2
    - $MVPF^2_{P_2}$ is marginal benefit to beneficiaries, normalized by govt cost
- Increasing spending on P_1 and decrease spending on P_2 increases welfare iff

$$\frac{\eta_1}{\eta_2} \geq \frac{MVPF^2_{P_2}}{MVPF^1_{P_1}}$$

  where $\eta_i = \frac{\psi_i}{\lambda_i}$ is the social marginal utility of income
- Okun (1980)

> *"Society can transport money from rich to poor only in a leaky bucket"*

Aside: Marginal Excess Burden (MEB)

- MVPF not the only definition
- Alternative definition of welfare: Marginal Excess Burden
  - How much additional revenue could the government get if the policy change is implemented but utility is held constant using individual specific lump-sum transfers
    - Can define MEB/MDWL in this framework
  - Let **v** denote a vector of pre-specified utilities (e.g. status quo <–> "equivalent variation" MEB in Auerbach and Hines 2002)
    - Define an augmented policy path:

$$P^v = \left\{ \left\{ \hat{\tau}_{ij}^I(\theta) \right\}_j, \left\{ \hat{\tau}_{ij}^X(\theta) \right\}_j, \hat{T}_i(\theta) + \hat{C}_i(\theta; v), \hat{G}(\theta) \right\}_i$$

where $\hat{C}_i(\theta; v)$ holds utilities constant at **v**.

Aside: Marginal Excess Burden (MEB)

- MEB is defined as

$$MEB_i^{v_i} = \frac{d\hat{t}_i^v}{d\theta}|_{\theta=0}$$

- Measures additional revenue government could obtain if it implements the policy but then holds people's utility constant using individual-specific lump-sum transfers
  - Depends on compensated elasticities (why?)
  - But does not correspond to measures of welfare for actual policies
  - Nor can it be estimated using causal effects of actual policies (that generally change utility)
- Therefore, proceed by focusing on MVPF
  - Which depends on WTP and causal effect of policy in question

Summary

- Key empirical quantities of interest for measuring welfare:
  - Individual's willing to pay for the policy expenditures (e.g. $\frac{\frac{\partial u}{\partial G}}{\lambda}$)
  - Fiscal externalities of the policy (causal impact of behavioral response to policy on govt budget)
- What **don't** we need to know?
  - Compensated elasticities...
  - Other behavioral responses (what about earnings?)
  - What about other externalities?

Aside: Pigouvian Externalities

- A brief aside: Externalities
- Suppose choosing x causes an externality, $E(\bar{x})$, where $\bar{x}$ is the aggregate choice of x in the population
- To make things simple, assume a single (representative) agent framework, but assume choosing x doesn't incorporate the effect on $\bar{x}$ (and thus the externality.)
- Utility is given by

$$u(x, I, G, E(x))$$

Aside: Pigouvian Externalities

- Marginal WTP for policy change:

$$\frac{\frac{d\hat{V}}{d\theta}}{\lambda} = \frac{d\hat{t}}{d\theta} + \left(\frac{\frac{\partial u}{\partial G}}{\lambda} - c\right)\frac{dG}{d\theta} + \tau^x \frac{d\hat{x}}{d\theta} + \tau^l \frac{d\hat{l}}{d\theta} + \frac{dE}{d\theta}\frac{\frac{\partial u}{\partial E}}{\lambda}$$

- Value of the policy change incorporates the impact of the externality:

$$\underbrace{\frac{dE}{d\theta}}_{\text{Causal impact on E}} \qquad \underbrace{\frac{\frac{\partial u}{\partial E}}{\lambda}}_{\text{Value of E}}$$

where $\frac{\frac{\partial u}{\partial E}}{\lambda}$ is the MWTP for E and $\frac{dE}{d\theta}$ is the causal (not compensated) impact on E.

Aside: Relation to Pigouvian Tax

- How does this related to Pigouvian taxes?
- Assume budget neutrality, no public goods, and no tax on labor
- Note that

$$\frac{dE}{d\theta} = \frac{dx}{d\theta}\frac{dE}{dx}$$

so

$$\frac{\frac{d\hat{V}}{d\theta}}{\lambda} = \left(\tau^x + \frac{dE}{dx}\frac{\frac{\partial u}{\partial E}}{\lambda}\right)\frac{d\hat{x}}{d\theta}$$

- Pigouvian tax:

$$\tau^{PIGOU} = -\frac{dE}{dx}\frac{\frac{\partial u}{\partial E}}{\lambda}$$

- Double dividend? Taxing x yields a 'cheaper' MCPF because it also deals with externality
  - Your exercise: Show this is true iff $\tau^x < \tau^{PIGOU}$. What if $\tau^x > \tau^{PIGOU}$
  - What about internalities?

Applications

- Top marginal tax rate increase
- EITC Generosity
- Food Stamps
- Job Training
- Section 8 Housing Vouchers

Top Tax Rate Increases

- Large literature studying causal impact of top tax rate increases / decreases
  - Will skip empirical literature already covered in 2450A
  - Saez, Slemrod, and Giertz (2012) provide review
    - Many estimates of causal effect of changes to top income tax rate
  - Suggests 25-50% of mechanical revenue lost (lots of disagreement/uncertainty!)
    - Fiscal cost is \$0.50-\$0.75 for \$1 in transfer
  - Suggests MVPF of \$1.33-\$2

$$MVPF = \frac{1}{1 - .25} = 1.33$$

  - Concerns?

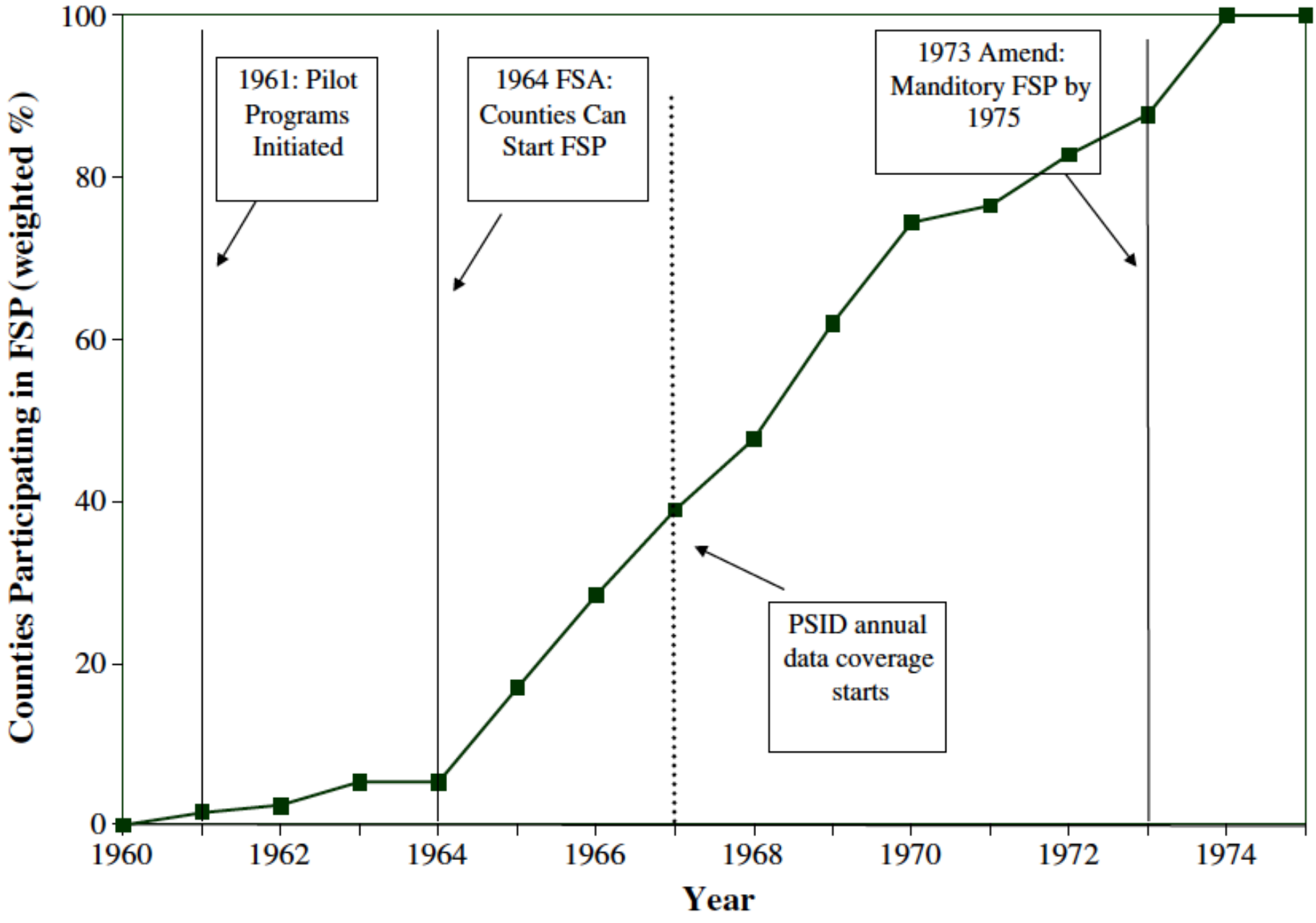
EITC Expansions

- Large literature studying causal impact of EITC expansions (Hotz and Scholz 2003, Chetty et al 2013)
  - Will also skip empirical literature on EITC covered in 2450A
    - EITC -> increase in earnings, but leads to greater collection of subsidies
    - Is increase in labor supply induced by EITC "Good"?
- Welfare calculation (see Hendren 2016)
  - Intensive + extensive calculations suggest fiscal cost of EITC is ~14% higher because of labor supply impacts
  - Fiscal cost is \$1.14 for \$1 in mechanical EITC benefits
  - Suggests MVPF of \$0.88

$$MVPF = \frac{1}{1 + .14} = 0.88$$

Food Stamps

- Food stamps imposes high marginal tax rates on earnings
- Hoynes and Schanzenbach (2012) use variation across counties in introduction of food stamp program (1960-70s)
- Use data from 1968-78 PSID
- Exploit variation in %counties providing food stamps


Counties Participating in FSP (weighted %)
100
80
60
40
20
0
1960
1962
1964
1966
1968
1970
1972
1974
Year
1961: Pilot Programs Initiated
1964 FSA: Counties Can Start FSP
1973 Amend: Manditory FSP by 1975
PSID annual data coverage starts

Food Stamps: Empirical Strategy

- Begin with difference-in-difference comparison
- Compare labor supply over counties across time

$$\begin{aligned} y_{ict} &= \alpha + \delta FSP_{ct} + \eta_c + \lambda_t + \mu_{st} \\ &\quad + \sigma CB60_c * t + \gamma REIS_{ct} + \epsilon_{ict} \end{aligned}$$

- FSP_{ct} is indicator for county participating in food stamp program
  - δ is impact of food stamp participation on y_{ict}
  - Controls for:
    - County fixed effects, η_c
    - Time fixed effects, λ_t
    - Linear state time trends, μ_{st}
    - 1960 census controls * time trends, $CB60_c * t$

Table 1
Impacts of food stamp introduction on labor supply and family income, by group.

	All nonelderly households		Nonelderly, head educ<=12	
	(1)	(2)	(3)	(4)
A. Any food stamps = 1				
County FSP implemented	0.037	0.041	0.051	0.060
	(0.007)***	(0.008)***	(0.009)***	(0.010)***
Number of observations	39,607	39,607	30,889	30,889

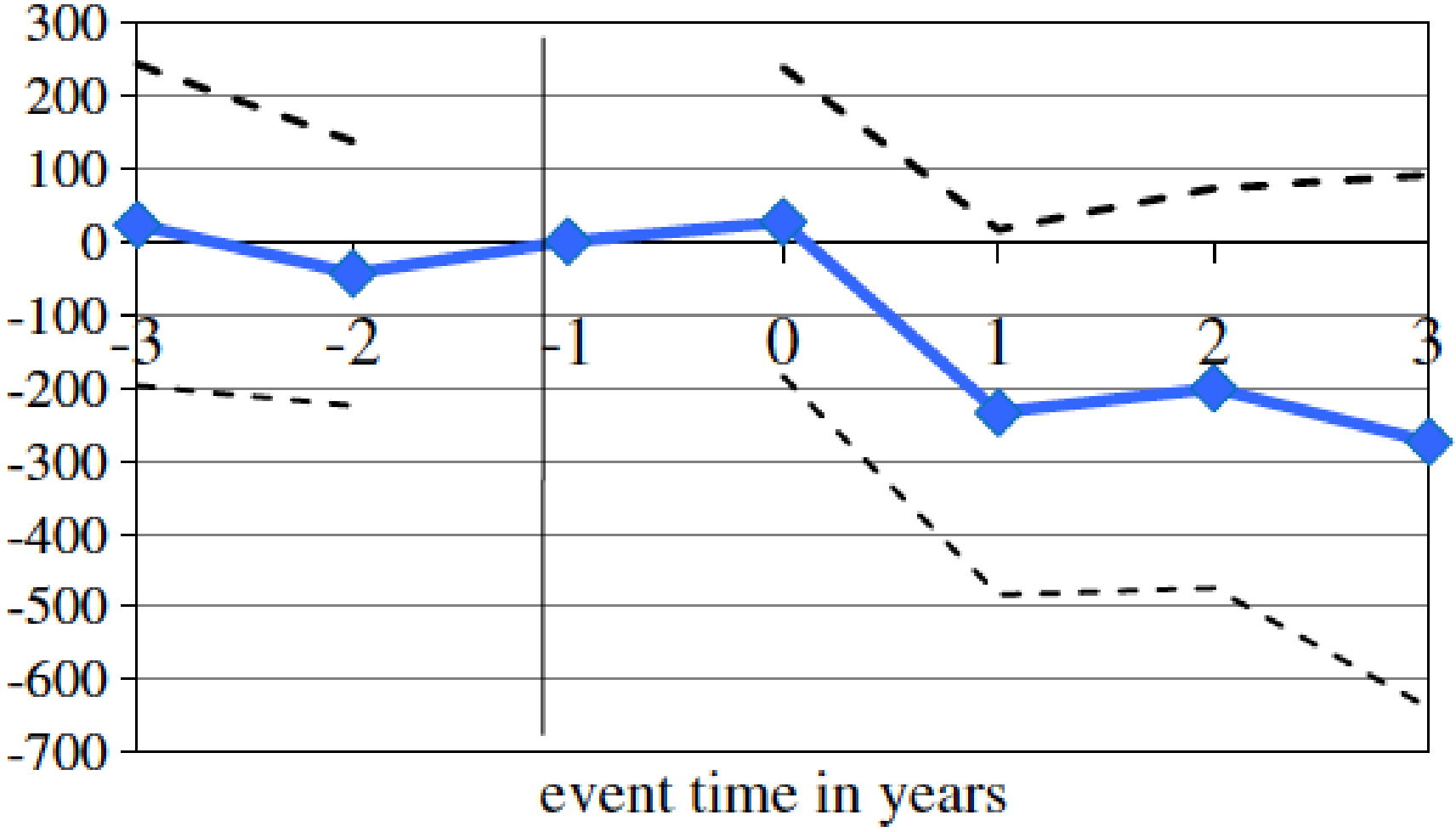
Event Study

- Rule of thumb: **Always** show graph for difference-in-difference analysis
- Compare labor supply over counties across time

$$\begin{aligned} y_{ict} &= \alpha + \sum_{j=-3}^{3} \pi_j 1\left(\tau_{ct} = j\right) + \eta_c + \lambda_t + \mu_{st} \\ &\quad + \sigma CB60_c * t + \gamma REIS_{ct} + \epsilon_{ict} \end{aligned}$$

- τ_{ct} is the event-year in which a county c joins the food stamp program
- Focus on labor hours as y_{ict}

b


300
200
100
0
-100
-200
-300
-400
-500
-600
-700
-3
-2
-1
0
1
2
3
event time in years

Results

- What is the ideal LHS variable?
  - Tax Revenue!
  - They don't look at this...
- Find large but imprecise decrease in labor earnings of \$2,943 (can't reject zero)
  - Assume 20% marginal tax rate -> \$588.60 impact on government budget
- Can recover implied fiscal cost
  - Average household transfer: \$1,153.25
  - Total cost is \$1,153.25+\$588.60=\$1,741.85.
- So:

$$\frac{1}{Cost} = \frac{1}{\frac{1}{|I|}\int_{i \in I} \frac{d\hat{t}_i^P}{d\theta} di} = \frac{1,153.25}{1741.85} = 0.66$$

  - What about Benefits?

WTP for Food Stamps

- Food stamps are "in-kind": $\frac{\frac{\partial u}{\partial G}}{\lambda} \neq 1$
  - May be that $\frac{\frac{\partial u}{\partial G}}{\lambda} < 1$ because goods are in kind
    - Smeeding (1982) estimates 0.97; Moffitt (1989) estimates ~1
    - Whitmore (2002) estimates 0.80 for marginal/distorted recipients
- Assuming food stamps valued as cash, MVPF is 0.66
  - Concerns?
  - Will return to methods for estimating $\frac{\frac{\partial u}{\partial G}}{\lambda}$ later in the semester

Job Training

- Government has programs that provide job training
  - Potential impacts?
- Job Training Partnership Act of 1982 provided job training services to low income youth and adults
- Bloom et al (1997) report results from RCT (I focus on adult women impact)
  - Main finding: Earnings increase of $1,683
    - Does this matter for welfare?
  - Increased tax collection of $236
  - Reduction in welfare benefits (AFDC) $235
    - $471 net increase in government budget from behavioral responses
  - Marginal cost of providing the training is $1,381
    - Cost net of fiscal externality is $910
  - MVPF is 1.52 if program costs are valued at its costs

Job Training

- No estimates of $\frac{\frac{\partial u}{\partial G}}{\lambda}$ for the program
  - Bloom et al (1997) implicitly assume earnings is fully valued
    - When is this OK?
    - Exercise: show earnings impacts matter if they come from relaxing constraints (e.g. higher wages) but not from changing labor effort
  - Earnings increase of \$1,683 for marginal cost of \$1,381 -> $\frac{\frac{\partial u}{\partial G}}{\lambda} = 1.22$
    - Suggests MVPF of 1.85 if increase was entirely productivity
  - But could be MVPF $= 0$ if no one valued it?

Section 8 Housing Vouchers

- Section 8 is largest low-income housing program in US
  - Provides vouchers to low-income households (see MTO experiment, etc.)
- Households pay 30% of their income for rent
  - Voucher covers the rest (subject to cap)
    - Later in semester: Collinson and Ganong on switch to "Small Area Fair Market Rents"
  - Removed from voucher program if income too high
- Section 8 is not a "right"
  - Need to apply at housing authorities

Jacob and Ludwig (2012)

- Jacob and Ludwig (2012) exploit excess applications in Illinois
  - Allocated via lottery
  - Estimate significant impact on labor supply and welfare take-up
    - Earnings decrease implies fiscal externality of \$129 per voucher
    - Welfare programs increase sum to \$432 (mostly medicaid)
    - But vouchers are a lot of money (\$8,400/yr)
    - Voucher cost \$1.05 for every \$1 of vouchers

$$MVPF = 0.95 \frac{\frac{\partial u}{\partial G}}{\lambda}$$

Section 8 Housing Vouchers

- Reeder (1985) suggests \$1 vouchers valued at $\frac{\frac{\partial u}{\partial G}}{\lambda} = 0.83$
  - People consume too much house?
- Suggests MVPF of 0.79 for housing vouchers
- Later in course: MTO and restricted vouchers to "high opportunity" neighborhoods
  - Chetty, Hendren, and Katz (2016) document impact on kids...

Summary

Policy	$\frac{\frac{\partial u}{\partial G}}{\lambda}$	$\frac{1}{\frac{1}{\lvert I \rvert}\int_i \frac{d\hat{t}_i}{d\theta} di}$	*MVPF*
Top Tax Rate	1	1.33 - 2	1.33 - 2
EITC Expansion	1	0.88	0.88
Food Stamps	0.8 - 1	0.66	0.53 - 0.66
Job Training	0 - 1.22	1.52	0 - 1.85
Housing Vouchers	0.83	0.95	0.79

- Taking $MVPF^{TopTax} = 1.33$, increasing EITC and top tax rate desirable iff

$$\frac{\eta^{Rich}}{\eta^{Poor}} \leq \frac{.88}{1.33} = 0.66$$

- \$0.66 to a poor person or \$1 to a rich person?
- Question: What about MEB comparisons?

Takeaways

- Need causal effect of policy in question
  - Is this what we used?
  - ATE/ATT/ITT?
- Also need WTP for non-market goods
  - This is the hard part!
- But, results suggest desire to focus on causal effects that effect government revenue

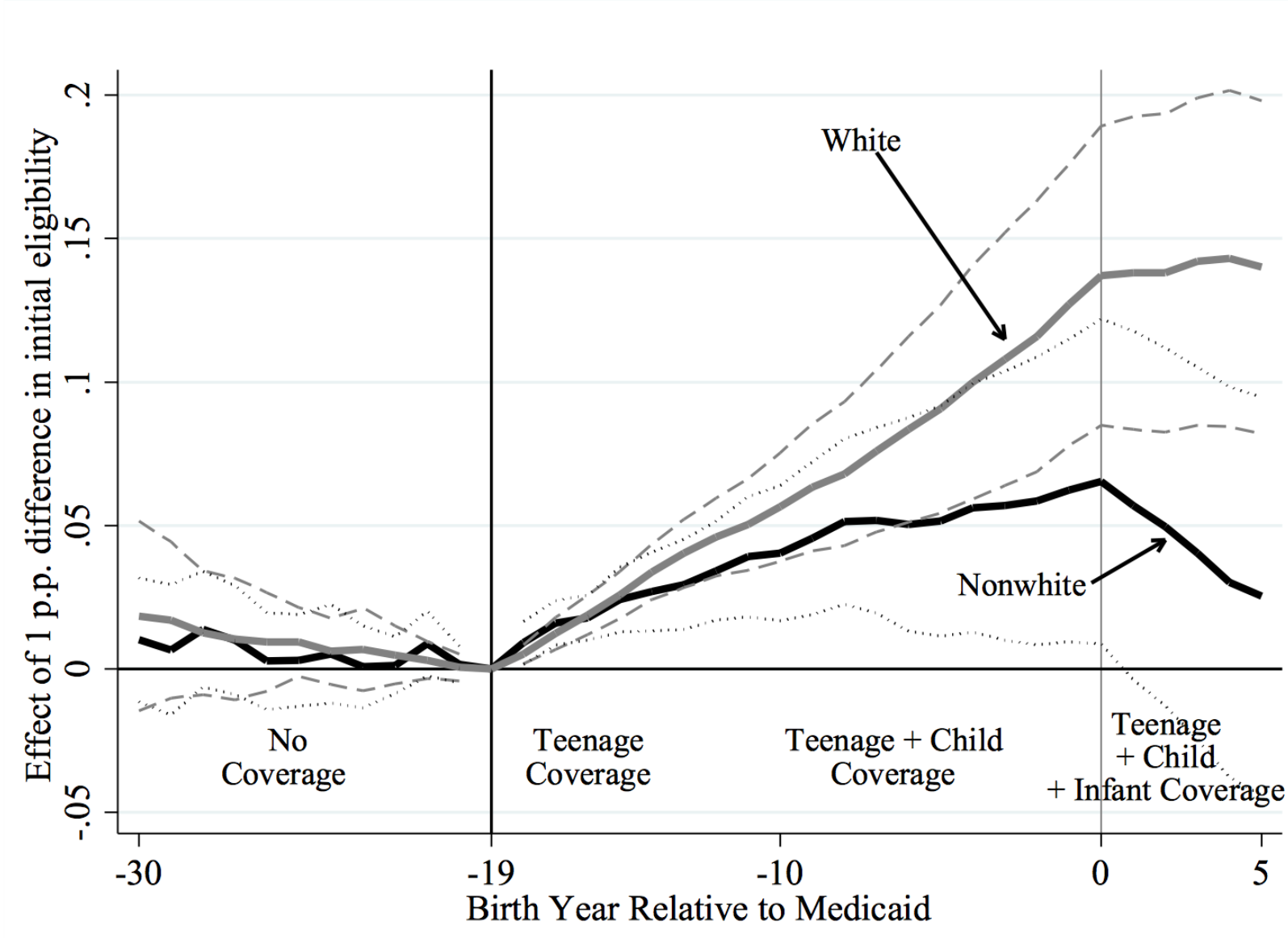
Other Policies?

- What about other policies?
  - Public goods?
  - Education?
  - Insurance mandates?
  - Information campaigns to increase take-up?
  - Medicaid expansions?

Medicaid

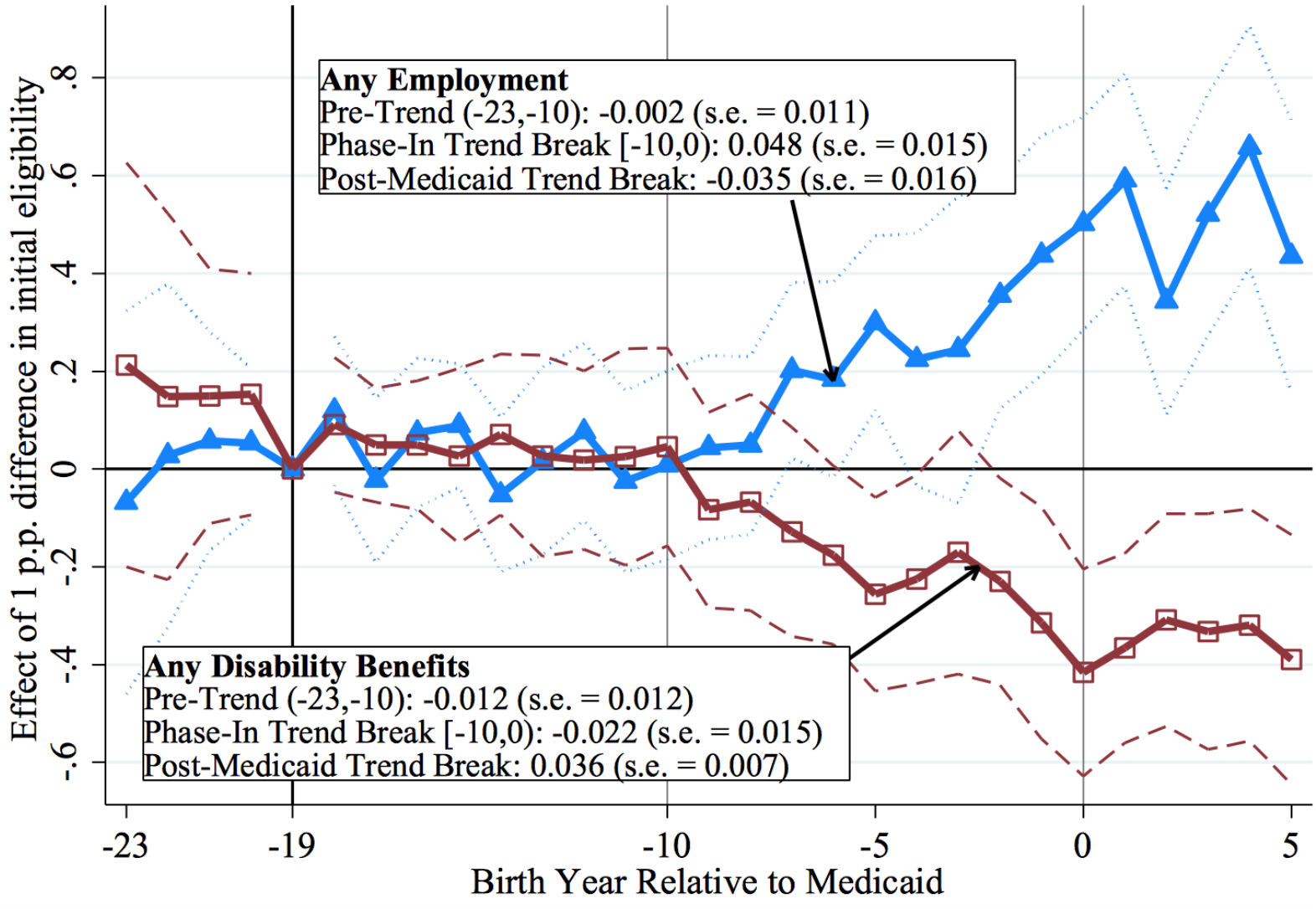
- Will discuss WTP for health insurance later in semester
- For now, look at impacts of Medicaid coverage for children on govt costs
- Recent paper: The Long-Run Effects of Childhood Insurance Coverage: Medicaid Implementation, Adult Health, and Labor Market Outcomes by Andrew Goodman-Bacon (NBER WP #22899)
  - States varied in their medicaid expansions to children (See Gruber)
  - Explore variation in state of birth by cohort in exposure to Medicaid

Figure 4. First-Stage Relationship Between Cumulative and Initial Medicaid Eligibility Before and After Medicaid Implementation



Notes: The dependent variable is each cohort's cumulative, migration-adjusted Medicaid eligibility for ages 0-18.

Figure 7. Reduced-Form Event-Study Estimates of Medicaid's Effect on Employment Rates and Disability Benefit Receipt, White Respondents (coefficients×100)



Notes: The dependent variable is the share of white respondents in each state-of-birth-by-cohort cell who report having any annual employment (closed triangles) or receiving income from a disability-related transfer program

Medicaid

- If health insurance for children increases their outcomes in adulthood, what does this mean for welfare?
  - Lowers effective cost of the government program!
- Welfare framework says "measure the real costs" not the program costs that are the line-item on the budget
  - Account for the impact of behavioral responses.

Summary

- Welfare framework suggests measuring benefits and costs
  - Benefits given by individual's WTP
  - Costs inclusive of fiscal externality
- Key limitations
  - Dynamics? Others?
  - Behavioral biases? v versus u?
- But we're not done: Aggregations across people require social welfare weights
  - How to identify?
  - Surveys (Saez and Stantcheva, 2013)
  - Inverse Optimum Approach (Next Topic)